APPENDIX Q

COST ESTIMATES FOR ALTERNATIVES CONSIDERED IN DETAIL FOR THE JACKSON COUNTY LAKE PROJECT

	War Fork and Steer Fork Site 3.5 mgd Capacity	Sturgeon Creek Upper Site 3.5 mgd Capacity	Sturgeon Creek Middle Site 8.5 mgd Capacity	Wood Creek Transmission Main 3.5 mgd Capacity
LAKE STATISTICS				
Normal Pool Elevation	980	980	989	
Maximum Flood Elevation	1,000	1,000	1,010	
Surface Area at Normal Pool	111	264	467	
Total Acres in Flood and Buffer	337	643	1,119	
Total Private Owned	54	643	1,119	
Total National Forest Service	283	0	0	
Approximate Dam Height	95	65	85	
Storage Capacity	1.438	1.449	3.586	
Drainage Area	10.850	15.620	21.230	
Number of Land Owners	7	52	74	

ACQUISITION COSTS

	Unit Price	Units	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost
Land in acres to be purchased	$800/1200	Acre	54	$42,880	643	$771,600	1,119	$1,342,800	4	$4,800
Houses	60,000	EA	0	0	27	1,620,000	44	2,640,000	0	0
Trailer	10,000	EA	0	0	4	40,000	6	60,000	0	0
Detached Garage	6,000	EA	0	0	4	24,000	10	60,000	0	0
Barns	15,000	EA	0	0	25	375,000	33	495,000	0	0
Outbuildings	1,000	EA	0	0	35	35,000	53	53,000	0	0
Title Search	300	EA	5	1,500	52	15,600	74	22,200	4	1,200
Title Insurance	1,400	EA	5	7,000	52	72,800	74	103,600	4	5,600
Survey	3,500	EA	5	17,500	52	182,000	74	259,000	4	14,000
Appraisal	300	EA	5	1,500	52	15,600	74	22,200	4	1,200
Review Appraisal	150	EA	5	750	52	7,800	74	11,100	4	600
NEPA Process/EIS/Land Exchange	200,000	LS	1	200,000	0	0	0	0	0	0
TOTAL ACQUISITION COST				$271,000		$3,159,400		$5,069,000		$27,000

RELOCATION COSTS

	Unit Price	Units	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost
Relocation Expense		$20,000	0	$0	27	$540,000	44	$880,000	0	$0
Cemetery Relocation		2,000	0	0	25	50,000	25	50,000	0	0
TOTAL RELOCATION COST				$0		$590,000		$930,000		$0

	War Fork and Steer Fork Site 3.5 mgd Capacity	Sturgeon Creek Upper Site 3.5 mgd Capacity	Sturgeon Creek Middle Site 8.5 mgd Capacity	Wood Creek Transmission Main 3.5 mgd Capacity
ADMINISTRATION & LEGAL COST				
Administration	$80,000	$90,000	$140,000	$89,000
Local Counsel	23,000	25,000	42,000	25,000
Bond Counsel	36,000	40,000	74,000	39,000
TOTAL ADMINISTRATION &LEGAL COST	$139,000	$150,000	$256,000	$153,000
SITE WORK (Road Realignments & New Construction)				
Two-Lane Paved Road	See Note 1 $2,000,000	See Note 1 $4,000,000	See Note 1 $4,000,000	$0
Construction Contingencies	200,000	400,000	400,000	0
Engineering	130,000	240,000	240,000	0
Inspection	80,000	115,000	115,000	0
TOTAL SITE WORK COST	$2,410,000	$4,755,000	$4,755,000	$0
WATER TRANSMISSION MAIN COST				
Transmission Main Construction Cost	$2,410,000	$1,678,000	See Note 2 $8,001,000	$8,658,000
Construction Contingencies	241,000	168,000	800,000	866,000
Engineering	190,000	141,000	524,000	567,000
Inspection	95,000	76,000	194,000	202,000
TOTAL TRANSMISSION MAIN COST	$2,936,000	$2,063,000	$9,519,000	$10,293,000
RESERVOIR COST				
Reservoir Area Clearing	$222,000	$528,000	$934,000	$0
Plugging or Abandonment of Existing Wells	0	112,000	180,000	0
Roller Compacted Concrete Dam	See Note 3 4,508,000	See Note 3 2,757,000	See Note 3 4,824,000	0
Construction Contingencies	473,500	340,000	594,000	0
Engineering	311,000	208,000	336,000	0
Geotechnical Investigations	170,000	160,000	170,000	0
Inspection	125,000	93,000	130,000	0
TOTAL RESERVOIR COST	$5,809,000	$4,198,000	$7,168,000	$0
MISCELLANEOUS COSTS				
Telephone Line Relocation	$20,000	$95,000	$180,000	$0
Electric Line Relocation	20,000	80,000	150,000	0
Water Line Relocation	0	180,000	590,000	0
Environmental & Preliminary Engineering	900,000	900,000	700,000	$800,000
TOTAL MISCELLANEOUS COSTS	$940,000	$1,255,000	$1,620,000	$800,000

	War Fork and Steer Fork Site 3.5 mgd Capacity	Sturgeon Creek Upper Site 3.5 mgd Capacity	Sturgeon Creek Middle Site 8.5 mgd Capacity	Wood Creek Transmission Main 3.5 mgd Capacity
TOTAL PROJECT COST SUMMARY				
Project Contingencies	$505,000	$571,000	$1,228,000	$564,000
TOTAL PROJECT COST	**$10,600,000**	**$11,991,000**	**$25,790,000**	**$11,837,000**
50 YR PRESENT WORTH OF OPER. & MAINT.*	**$1,624,000**	**$1,295,000**	**$3,952,000**	**$2,869,000**
TOTAL COST FOR WTP EXPANSION	**$3,900,000**	**$3,900,000**	**$3,900,000**	**$0**
PRESENT WORTH OF WATER TREATMENT/PURCHASE**	**$4,240,000**	**$4,240,000**	**N/A**	**$12,757,000**
TOTAL PROJECT COST and OPER. & MAINT.*	**$20,364,000**	**$21,426,000**	**N/A**	**$27,463,000**
RESIDENTIAL WATER RATE PROJECTED INCREASE**				
Projected Rate Increase for JCWA	28.16%	31.38%	Information Not Provided	47.87%
Average Monthly Residential Bill (4,517 gallons) (Existing Average Bill: $25.02)	$32.05	$32.87		$36.99
Increased Cost for Average Monthly Bill	$7.03	$7.85		$11.97

NOTES:

1. Road Construction Cost estimated at $1,000,000 per mile. Road lengths were estimated at 2.0 miles for the War Fork site and 4.0 miles for the Sturgeon Creek sites. Road work estimated herein is for County owned roads only. It has been assumed that the costs associated with relocating any State owned roads will be provided by the Kentucky Department of Transportation (KDOT).
2. Includes the construction cost of a 5.0 mgd transmission main from the reservoir to the City of Manchester's Water Treatment Plant.
3. Includes the cost of the RCC Dam, Construction Access Roads, and Mobilization.

	War Fork and Steer Fork Site 1.3 mgd Capacity	War Fork and Steer Fork Site 2.2 mgd Capacity	Wood Creek Transmission Main 2.19 mgd Capacity	Kentucky River Transmission Main 2.19 mgd Capacity
LAKE STATISTICS				
Normal Pool Elevation	946	960		
Maximum Flood Elevation	966	980		
Surface Area at Normal Pool	65	88		
Total Acres in Flood and Buffer	215	275		
Total Private Owned	23	31		
Total National Forest Service	192	244		
Approximate Dam Height	61	75		
Storage Capacity	0.563	0.906		
Drainage Area	10.850	10.850		

ACQUISITION COSTS										
	Unit Price	Units	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost
Land in acres to be purchased	$800/1200	Acre	23	$18,400	31	$24,800	4	$4,800	2	$2,400
Houses	60,000	EA	0	0	0	0	0	0	0	0
Trailer	10,000	EA	0	0	0	0	0	0	0	0
Detached Garage	6,000	EA	0	0	0	0	0	0	0	0
Barns	15,000	EA	0	0	0	0	0	0	0	0
Outbuildings	1,000	EA	0	0	0	0	0	0	0	0
Title Search	300	EA	5	1,500	5	1,500	4	1,200	2	600
Title Insurance	1,400	EA	5	7,000	5	7,000	4	5,600	2	2,800
Survey	3,500	EA	5	17,500	5	17,500	4	14,000	2	7,000
Appraisal	300	EA	5	1,500	5	1,500	4	1,200	2	600
Review Appraisal	150	EA	5	750	5	750	4	600	2	300
NEPA Process/EIS/Land Exchange	200,000	LS	1	200,000	1	200,000	0	0	0	0
TOTAL ACQUISITION COST				$247,000		$253,400		$27,600		$14,000

RELOCATION COSTS										
	Unit Price	Units	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost
Relocation Expense		$20,000	0	$0	0	$0	0	$0	0	$0
Cemetery Relocation		2,000	0	0	0	0	0	0	0	0
TOTAL RELOCATION COST				$0		$0		$0		$0

	War Fork and Steer Fork Site 1.3 mgd Capacity	War Fork and Steer Fork Site 2.2 mgd Capacity	Wood Creek Transmission Main 2.19 mgd Capacity	Kentucky River Transmission Main 2.19 mgd Capacity
ADMINISTRATION & LEGAL COST				
Administration	$51,000	$62,000	$68,000	$57,000
Local Counsel	19,000	20,000	21,000	20,000
Bond Counsel	27,000	31,000	32,000	29,000
TOTAL ADMINISTRATION &LEGAL COST	$97,000	$113,000	$121,000	$106,000
SITE WORK (Road Realignments & New Construction)				
Two-Lane Paved Road	See Note 1 $2,000,000	See Note 1 $2,000,000	$0	$0
Construction Contingencies	200,000	200,000	0	0
Engineering	130,000	130,000	0	0
Inspection	80,000	80,000	0	0
TOTAL SITE WORK COST	$2,410,000	$2,410,000	$0	$0
WATER TRANSMISSION MAIN COST				
Transmission Main Construction Cost	$1,705,000	$1,932,000	$6,403,000	$5,244,000
Construction Contingencies	171,000	193,000	640,000	524,000
Engineering	143,000	152,000	433,000	365,000
Inspection	77,000	77,000	163,000	150,000
TOTAL TRANSMISSION MAIN COST	$2,096,000	$2,354,000	$7,639,000	$6,283,000
RESERVOIR COST				
Reservoir Area Clearing	$130,000	$176,000	$0	$0
Plugging or Abandonment of Existing Wells	0	0	0	0
Roller Compacted Concrete Dam	See Note 2 2,277,000	See Note 2 3,222,000	0	0
Construction Contingencies	241,500	340,000	0	0
Engineering	174,000	234,000	0	0
Geotechnical Investigations	155,000	165,000	0	0
Inspection	83,000	102,000	0	0
TOTAL RESERVOIR COST	$3,060,000	$4,239,000	$0	$0
MISCELLANEOUS COSTS				
Telephone Line Relocation	$20,000	$20,000	$0	$0
Electric Line Relocation	20,000	20,000	0	0
Water Line Relocation	0	0	0	0
Environmental & Preliminary Engineering	900,000	900,000	800,000	$800,000
TOTAL MISCELLANEO US COSTS	$940,000	$940,000	$800,000	$800,000

	War Fork and Steer Fork Site 1.3 mgd Capacity	War Fork and Steer Fork Site 2.2 mgd Capacity	Wood Creek Transmission Main 2.19 mgd Capacity	Kentucky River Transmission Main 2.19 mgd Capacity
TOTAL PROJECT COST SUMMARY				
Project Contingencies	$322,000	$395,000	$429,000	$360,000
TOTAL PROJECT COST	**$6,762,000**	**$8,313,000**	**$9,016,000**	**$7,563,000**
50 YR PRESENT WORTH OF OPER. & MAINT.*	**$1,022,000**	**$1,337,000**	**$2,425,000**	**$2,658,000**
TOTAL COST FOR WTP EXPANSION	**$3,900,000**	**3,900,000**	**$0**	**3,900,000**
PRESENT WORTH OF WATER TREATMENT/PURCHASE**	**$2,504,000**	**$3,192,000**	**$8,742,000**	**$3,192,000**
TOTAL PROJECT COST and OPER. & MAINT.*	**$14,188,000**	**$16,723,000**	**$20,183,000**	**$17,313,000**
RESIDENTIAL WATER RATE PROJECTED INCREASE**				
Projected Rate Increase for JCWA	17.29%	21.72%	33.17%	22.19%
Average Monthly Residential Bill (4,517 gallons) (Existing Average Bill: $25.02)	$29.33	$30.45	$33.31	$30.56
Increased Cost for Average Monthly Bill	$4.31	$5.44	$8.30	$5.54

NOTES:

1. Road Construction Cost estimated at $1,000,000 per mile. Road lengths were estimated at 2.0 miles for the War Fork site and 4.0 miles for the Sturgeon Creek Sites. Road work estimated herein is for County owned roads only. It has been assumed that the costs associated with relocating any State owned roads will be provided by KYDOT.
2. Includes the cost of the RCC Dam, Construction Access Roads, and Mobilization.

			Wood Creek Transmission Main 1.33 mgd Capacity		Kentucky River Transmission Main 1.33 mgd Capacity		Rockcastle River Transmission Main 3.5 mgd Capacity		Indian Creek Transmission Main 2.0 mgd Capacity	
ACQUISITION COSTS										
	Unit Price	Units	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost
Land in acres to be purchased	$800/1200	Acre	4	$4,800	2	$2,400	2	$2,400	2	$2,400
Houses	60,000	EA	0	0	0	0	0	0	0	0
Trailer	10,000	EA	0	0	0	0	0	0	0	0
Detached Garage	6,000	EA	0	0	0	0	0	0	0	0
Barns	15,000	EA	0	0	0	0	0	0	0	0
Outbuildings	1,000	EA	0	0	0	0	0	0	0	0
Title Search	300	EA	4	1,200	2	600	3	222	2	148
Title Insurance	1,400	EA	4	5,600	2	2,800	3	222	2	148
Survey	3,500	EA	4	14,000	2	7,000	3	222	2	148
Appraisal	300	EA	4	1,200	2	600	3	222	2	148
Review Appraisal	150	EA	4	1,200	2	300	3	222	2	148
NEPA Process/EIS/Land Exchange	200,000	LS	0	0	0	0	0	0	0	0
TOTAL ACQUISITION COST				$27,000		$14,000		$3,510		$3,140
RELOCATION COSTS										
	Unit Price	Units	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost
Relocation Expense		$20,000	0	$0	0	$0	0	$0	0	$0
Cemetery Relocation		2,000	0	0	0	0	0	0	0	0
TOTAL RELOCATION COST				$0		$0		$0		$0
ADMINISTRATION & LEGAL COST										
Administration				$57,000		$52,000		$35,000		$25,000
Local Counsel				20,000		19,000		20,000		15,000
Bond Counsel				29,000		27,000		30,000		25,000
TOTAL ADMINISTRATION &LEGAL COST				$106,000		$98,000		$85,000		$65,000
SITE WORK (Road Realignments & New Construction)										
Two-Lane Paved Road				$0		$0		$0		$0
Construction Contingencies				0		0		0		0
Engineering				0		0		0		0
Inspection				0		0		0		0
TOTAL SITE WORK COST				$0		$0		$0		$0

	Wood Creek Transmission Main 1.33 mgd Capacity	Kentucky River Transmission Main 1.33 mgd Capacity	Rockcastle River Transmission Main 3.5 mgd Capacity	Indian Creek Transmission Main 2.0 mgd Capacity
WATER TRANSMISSION MAIN COST				
Transmission Main Construction Cost	$5,299,000	$4,737,000	$5,190,000	$3,470,000
Construction Contingencies	530,000	474,000	519,000	347,000
Engineering	364,000	334,000	301,000	213,000
Inspection	146,000	141,000	137,000	109,000
TOTAL TRANSMISSION MAIN COST	$6,339,000	$5,686,000	$6,147,000	$4,139,000
MISCELLANEOUS COSTS				
Telephone Line Relocation	$0	$0	$0	$0
Electric Line Relocation	0	0	0	0
Water Line Relocation	0	0	0	0
Environmental & Preliminary Engineering	800,000	800,000	200,000	150,000
TOTAL MISCELLANEOUS COSTS	$800,000	$800,000	$200,000	$150,000
TOTAL PROJECT COST SUMMARY				
Project Contingencies	$364,000	$330,000	$322,000	$218,000
TOTAL PROJECT COST	**$7,639,000**	**$6,928,000**	**$6,757,510**	**$4,575,140**
50 YR PRESENT WORTH OF OPER. & MAINT.*	**$1,816,000**	**$2,036,000**	**$4,010,000**	**$2,840,000**
TOTAL COST FOR WTP EXPANSION	**$0**	**$3,900,000**	**$3,900,000**	**$3,900,000**
PRESENT WORTH OF WATER TREATMENT/PURCHASE**	**$6,761,000**	**$2,504,000**	**$4,240,000**	**N/A**
TOTAL PROJECT COST and OPER. & MAINT*	**$16,213,000**	**$15,368,000**	**$18,907,510**	**N/A**
RESIDENTIAL WATER RATE PROJECTED INCREASE**				
Projected Rate Increase for JCWA	28.81%	20.04%		
Average Monthly Residential Bill (4,517 gallons) (Existing Average Bill: $25.02)	$32.23	$30.02		
Increased Cost for Average Monthly Bill	$7.21	$5.00		

* The present worth analysis of operation, maintenance, and replacement costs conducted for this FEIS evaluated the operation, maintenance, and replacement costs for each year of the useful life of each alternative, or 50 years. These future costs were related back to the present using an interest factor, or discount rate, of five percent. The present worth of the annual operation, maintenance, and replacement costs were then totalized. The total present worth value calculated for each alternative was then added to the alternative's development cost in order to adequately compare the costs of each alternative (JCEZ, 2000).

A review of present worth analysis conducted for each alternative revealed that an inaccurate discount rate (five percent) was used in the calculations. The discount rate used for the analysis must comply with the Office of Management and Budget's Circular A-94 (Deal, 2001). The 30-year real discount rate is currently 4.2 percent, and is updated annually, typically at the beginning of each year (OMB, 2000). A real discount rate is used to adjust benefits or costs to eliminate the effect of expected inflation (OMB, 1992). Use of this somewhat lower rate would result in slightly higher present worth costs for operation, maintenance, and replacement, and thus slightly higher total project costs, than are presented in the above tables. However, application of this lower discount rate across all alternatives would not change the relative ranking of alternatives by cost.

** A review and comparison of the methodologies used to calculate JCWA water production costs and water purchase costs from the Wood Creek Water District (see the Present Worth Analysis of Water Production Costs and Water Purchase Costs provided in Appendix S of this FEIS) revealed some inconsistencies. It was noted that the actual water purchase cost for water from Wood Creek Water District would not increase by the exact cost of additional debt and depreciation. In addition, it was noted that the exiting JCWA Treatment Plant overhead costs, salaries, insurance, and other such expenditures would not increase in an amount directly proportional to the amount of water produced from the plant; the total water produced would be produced at a somewhat lower cost. Accounting for these factors, the cost of purchasing water from Wood Creek Water District would likely be less than the $1.57 per 1,000 gallons that was used in this analysis. Also, the cost of water treatment at the JCWA Treatment Plant would likely be higher than the $0.37 per 1,000 gallons of water that was used in this analysis, due to costs associated with water treatment in addition to those presented in the feasibility study (Deal, 2001).

Another factor that was noted to be inconsistent during the review of the water user rate impacts was the useful lifetime of the alternatives (Deal, 2001). The analysis of impacts on water user rates assumed all alternatives would have the same useful life (JCEZ, 2000). However, there are major components of the reservoir alternatives that would result in a longer useful life than any of the water transmission main alternatives. The useful lifetime of an alternative would only impact estimates of the water user rates, and not the total project cost of the alternative (Deal, 2001).

Since review of the methodology used to estimate impacts on water user rates resulting from the alternatives noted inconsistencies in items that could potentially affect the ranking of alternatives, sample calculations were carried out using adjusted factors. For these calculations, the discount rate was changed to 4.2 percent for all trials. Several combinations of water purchase cost (reduced as low as the current Wood Creek Water District wholesale rate of $1.24 per 1,000 gallons of water), JCWA water treatment cost (increased as high was $0.70 per 1,000 gallons of water), and extended useful lifetime of the reservoir alternatives (increased as high was 100 years) were calculated. It was concluded from these calculations that the ranking of the alternatives is not highly sensitive to these parameters. In other words, even when the most extreme values of these parameters were used, the ranking of alternatives in terms of impacts on water user rates did not change (Deal, 2001).